

ABSTRACT

The present invention provides various processes for selectively removing undesirably sized catalyst particles from a reaction system. In one embodiment, a plurality of catalyst particles, having a first median particle diameter, is withdrawn from the reaction system and is directed to a separation unit such as a counter flow cyclone separator. In the separation unit, the particles are separated into a small catalyst stream and a large catalyst stream, the small catalyst stream having a second median particle diameter less than the first median particle diameter, and the large catalyst stream having a third median particle diameter greater than the first median particle diameter. At least a portion of the small or large catalyst stream is then directed back to the reaction system in order to maintain a desirable particle size distribution therein.